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Short Report

Cyberdrugs: a cross-sectional study of online pharmacies characteristics

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As e-commerce and online pharmacies (OPs) arose, the potential impact of the Internet on the world of health shifted from merely the spread of information to a real opportunity to acquire health services directly. Aim of the study was to investigate the offer of prescription drugs in OPs, analysing their characteristics, using the content analysis method. The research performed using the Google search engine led to an analysis of 118 online pharmacies. Only 51 (43.2%) of them stated their precise location. Ninety-six (81.4%) online pharmacies did not require a medical prescription from the customer's physician. Online pharmacies rise complex issues in terms of patient–doctor relationship, consumer empowerment, drug quality, regulation and public health implications.

Keywords: internet, pharmaceutical preparations, public health.

Introduction

Online pharmacies (OPs) are companies which sell drugs, including prescription-only drugs, through the Internet. This phenomenon started in the late nineties[1] and has grown so much that the United States Food and Drug Administration (FDA) defines it as a 'serious public health risk', when it becomes 'the sale of unapproved drugs and the illegal sale of approved drugs over the Internet'.[2] The World Health Organization (WHO) faces this issue in the context of counterfeit medicines, which are defined as 'a global public health crisis', stating that 'medicines purchased over the Internet from sites that conceal their physical address are counterfeit in over 50% of cases'.[3] In this context, it is very difficult to estimate the number of people buying online, the volume of drugs traded and the economic extent of this business.[4] Anyway, the risk represented by a free market of prescription drugs which transforms patients into consumers is clearly exemplified by some clinical cases arising in association with medication purchased via the Internet,[5] and by surveys in which researchers successfully purchased prescription medications by the internet.[6] Until now, e-commerce of drugs does not yet seem to have spread much in Europe, but the Sentence of the EU Court of Justice related to the 'Doc Morris case' shows how living the matter can quickly become.[1,7] In order to investigate the offer of online prescription drugs, we conducted a survey of OPs using a search engine and we analysed the characteristics of the websites found, focusing in particular on the geographical features of the companies, on their prescription requirements and promotion strategies, on the kind of drugs offered and the declaration of side effects.

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Methods

The search for OPs was conducted in August 2007 using the Google search engine and the entire web was searched using as keywords 'online pharmacies', 'online drugstore', 'drugs online' and 'medicines online', according to the methodology of previous OPs investigations.[8] The first 30 references were analysed for each keyword. The inclusion language was at least English, and the sampling frame comprised only OPs selling directly. The OPs websites were coded using an *ad hoc* Codebook, according to the Content Analysis method,[9] about address, extension, prescription requirements and selling arguments. We investigated whether the OPs gave a detailed physical location with a clear geographical reference or had only a virtual interface. We examined the offer of prescription drugs, in particular of specific drugs with a high intrinsic risk of being dangerous or inappropriate: tramadol, alprazolam, amitriptyline, amphetamine or metamphetamine, codeine or hydrocodone, fluxetine, methylphenidate, phentermine, sidenafil, stanozolol, tramadol and valproic acid. An analysis of the declared side effects was conducted on the four most frequent drugs present in the OPs among the tracked ones listed above. The data were analysed with STATA (Stata Statistical Software Release 8.0, 2003; Stata Corporation, College Station, TX) using a descriptive approach and calculating statistical significance using the χ^2 test, the Fisher exact test and the Mann–Whitney test, rejecting the null hypothesis below a P-value of 0.05.

Results

We found 118 websites fitting the inclusion criteria, of which 51 (43.2%) with a specific address and 67 (56.8%) with a virtual interface only. The most frequent website extension was '.com', in 91 OPs (77.1%). Domains of registration were distributed as follows in the world areas: 60 (50.9%) in the United States, 26 (22.0%) in Europe, 11 (9.3%) in Canada and 15 (12.7%) in other countries; for six websites (5.0%) it was not possible to ascertain domain registration. Fifty-one (43.2%) of the OPs gave full details of the physical location: 18 stated they were in the United States (35.3%), 18 in Europe (35.3%), 10 in Canada (19.6%) and five elsewhere (9.8%). Only in the 54.9% of OPs declaring their physical location, the latter corresponded to the area of domain registration.

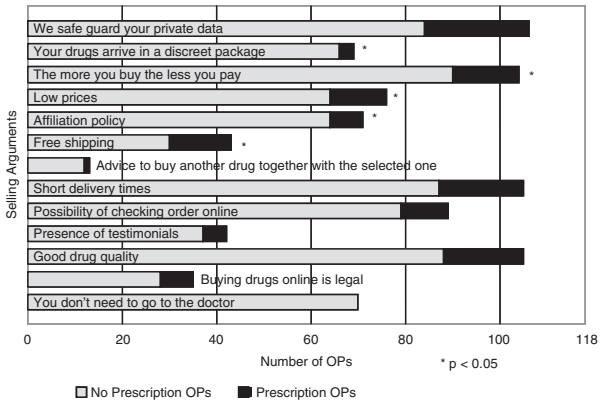

Figure 1 Number of selling arguments present on the sample frame of the 118 online pharmacies

Forty-nine (41.5%) OPs declared the location of drug delivery, which was mostly Asia (23 OPs, 46.9%), followed by the United States (12 OPs, 24.5%). Agreement between declared physical location and delivery location was found in 31.4% of OPs proving both details.

Regarding prescription requirement, 22 (18.6%) OPs asked for a medical prescription (prescription online pharmacies, POPs), made out by the consumer's physician. The remaining 96 OPs (81.4%) did not ask for a medical prescription (non-prescription online pharmacies, nPOPs); of these, 30 (31.6%) did not ask for any kind of medical information, whereas 66 (68.8%) required the consumer to fill in a medical questionnaire. POPs declared their physical location more often (72.7%) compared with nPOPs (36.5%), with a statistically significant difference (Fisher exact test: $p = 0.003$).

An analysis of the sales promotion strategies revealed that the most frequent were the safe use of personal data, short delivery times, high drug quality, and the suggestion to buy more to pay less. The selling argument regarding not having to undergo a doctor's examination and avoiding costs, queues and embarrassment was present in 72.9% of nPOPs. We compared the use of selling arguments in POPs and nPOPs, and we found more present in nPOPs than in POPs with a statistically significant difference the selling arguments about discreet packaging, the suggestion to buy more to pay less, and the promotion of a affiliation policy; free shipping policy was performed more frequently in POPs (figure 1).

When we investigated the drugs that we chose for tracking wideness of offering, on the 118 websites all of them were available both in POPs and nPOPs; most frequently we found sidenafil, fluoxetine, tramadol and amitriptyline.

In about one-fourth of OPs, no side effects were declared for the four most frequently sold tracked drugs. The number of declared side effects was significantly higher in nPOPs than in POPs for fluoxetine and amitriptyline and not significantly for tramadol, whereas the number of side effects for sidenafil was significantly lower in nPOPs than in POPs (Mann–Whitney test).

Discussion

This results show that more than half of the OPs did not declared their physical location, and a great discordance was detected between domain of registration, compared with physical and delivery location, when declared. More than 80% of the OPs did not asked for a medical prescription, made out by the consumer's physician, in order to purchase drugs. Many selling arguments were used to promote drugs, included non having to see a doctor in order to access drugs. One forth of OPs did not declared any side effect.

There are no doubts that the Internet—through its world-wide network of computers allowing the global sharing of information—has changed several aspects of our lives. In 1999, health information was already being reported as among the top three reasons why people use the web.[10] But the big issue which is arising now is that it is no longer merely a question of information and knowledge: patients can now use the Internet to purchase health services directly, i.e. drugs, medical devices and medical tests.

About drugs, the chance to avoid prescription boundaries can be a potential disruptor at multiple levels, both at an individual level, between doctor and patient, becoming an easy way to overcome the health professional filter in order to access drugs,[11] and at a public health level, where national health services can be influenced by mixed accesses in regulated systems.[1]

Besides, the characteristics of OPs could be associated with the quality of the drugs and service. Indeed, there have been reports of concern regarding the drugs storage and shipping conditions, fraudulent and dangerous practices.[11]

As a final consideration, thinking about the reasons that could lead a European citizen to purchase drugs from OPs, it could be hypothesised that the opportunity to avoid doctors and safeguard privacy are the main reasons, instead of economic ones for people who live in a regulated drugs market where final drugs prices are negotiated.

Conclusion

In conclusion, OPs are likely to become an important public health issue in the near future, as they are growing in volume and controversy.[12] The fairly strict controls on the sale of drugs which health authorities have successfully implemented since the late 1990s can now be avoided quite easily through e-commerce, which takes place in a globalized world with virtually no barriers, and legislation seems to be late in regulating this complex and dynamic issue.

In our opinion, the problem should be studied and addressed on different levels: from the regulation point of view, by increasing control and facing the legal issues; from the public health point of view, by increasing awareness about the risks associated with buying drugs on the Internet and reinforcing the trust-based relationship between patient and both the Pharmacist and the General Practitioner.

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  - A content analysis of websites offering prescription-only drugs; *Orizio G, Schulz P, Domenighini S, Rosati C, Rubinelli S, Caimi L, Gelatti U.*
- 43° Congresso Nazionale SItI 'La promozione della salute per lo sviluppo sociale ed economico dell'Italia: il contributo dell'Igiene e della Sanità Pubblica' – Bari 1-4 Ottobre 2008.
  - La vendita dei farmaci in internet: implicazioni in termini di salute pubblica; *Orizio G, Schulz P, Domenighini S, Rosati C, Rubinelli S, Donato F, Caimi L, Gelatti U.*

Conflicts of interest: None declared.

Key points

- A cross-sectional study was performed on websites selling drugs, analysing 118 online pharmacies, and we found that the majority of them did not ask for a medical prescription, made out by the consumer's physician, in order to purchase prescription drugs.
- Numerous selling arguments were present to promote drugs selling, in particular about the chance to purchase prescription medications without prescription and avoiding to see a doctor.
- Direct access to drugs through the internet rises complex issues in terms of patient–doctor and patient–pharmacist relationship, drug quality, health policy, still to be faced both at a national and at an international level.

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